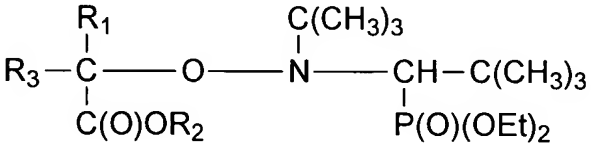
What is claimed is:

1. A process for the miniemulsion, microemulsion or emulsion polymerization of at least one monomer which can be polymerized by the radical route, characterized in that it is carried out in the presence of at least one water-soluble alkoxyamine, preferably:

a monoalkoxyamine of formula (I)



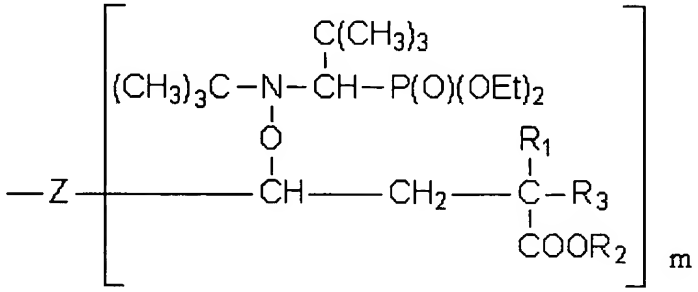
(I)

in which

* R_1 and R_3, which are identical or different, represent a linear or branched alkyl radical having a number of carbon atoms ranging from 1 to 3,

* R_2 represents an alkali metal, such as Li, Na or K, or an ammonium ion, such as NH_4^+, NBu_4^+ or $NHBu_3^+$,

or a mono- or a polyalkoxyamine of formula (II)



(II)

where m is an integer of greater than or equal to 1, preferably of greater than or equal to 2, and R_1, R_2 and R_3 have the same meaning as in the formula (I).

2. The process as claimed in claim 1, characterized in that the water-soluble alkoxyamine is introduced into the polymerization medium in a proportion of 0.01% to 10%, preferably 0.1 to 5%, by weight, with respect to the weight of monomer(s).

3. The process as claimed in claim 1 or 2, characterized in that the monomer or monomers which can be polymerized by the radical route are chosen from monomers exhibiting a carbon-carbon double bond capable of polymerizing by the radical route and

in particular from vinylaromatic monomers, such as styrene or substituted styrenes, in particular α-methylstyrene and sodium styrenesulfonate, dienes, such as butadiene or isoprene, acrylic monomers, such as acrylic acid or its salts, alkyl, cycloalkyl or aryl acrylates, such as methyl, ethyl, butyl, ethylhexyl or phenyl acrylate, hydroxyalkyl acrylates, such as 2-hydroxyethyl acrylate, ether alkyl acrylates, such as 2-methoxyethyl acrylate, alkoxy- or aryloxypolyalkylene glycol acrylates, such as methoxypolyethylene glycol acrylates, ethoxypolyethylene glycol acrylates, methoxypolypropylene glycol acrylates, methoxypolyethylene glycol-polypropylene glycol acrylates or their mixtures, aminoalkyl acrylates, such as 2-(dimethylamino)ethyl acrylate (ADAME), acrylates of amine salts, such as [2-(acryloyloxy)ethyl]trimethylammonium chloride or sulfate or [2-(acryloyloxy)ethyl]dimethylbenzylammonium chloride or sulfate, fluoroacrylates, silylated acrylates or phosphorus-comprising acrylates, such as alkylene glycol acrylate phosphates, methacrylic monomers, such as methacrylic acid or its salts, alkyl, cycloalkyl, alkenyl or aryl methacrylates, such as methyl, lauryl, cyclohexyl, allyl or phenyl methacrylate, hydroxyalkyl methacrylates, such as 2-hydroxyethyl methacrylate or 2-hydroxypropyl methacrylate, ether alkyl methacrylates, such as 2-ethoxyethyl methacrylate, alkoxy- or aryloxypolyalkylene glycol methacrylates, such as methoxy-polyethylene glycol methacrylates, ethoxypolyethylene glycol methacrylates, methoxy-polypropylene glycol methacrylates, methoxypolyethylene glycol-polypropylene glycol methacrylates or their mixtures, aminoalkyl methacrylates, such as 2-(dimethylamino)-ethyl methacrylate (MADAME), methacrylates of amine salts, such as [2-(methacryloyloxy)ethyl]trimethylammonium chloride or sulfate or [2-(methacryloyloxy)-ethyl]dimethylbenzylammonium chloride or sulfate, fluoromethacrylates, such as 2,2,2-trifluoroethyl methacrylate, silylated methacrylates, such as 3-methacryloyloxy-propyltrimethylsilane, phosphorus-comprising methacrylates, such as alkylene glycol methacrylate phosphates, hydroxyethylimidazolidone methacrylate, hydroxyethyl-imidazolidinone methacrylate or 2-(2-oxo-1-imidazolidinyl)ethyl methacrylate, acrylonitrile, acrylamide or substituted acrylamides, 4-acryloylmorpholine, N-methylol-acrylamide, acrylamidopropyltrimethylammonium chloride (APTAC), acrylamido-methylpropanesulfonic acid (AMPS) or its salts, methacrylamide or substituted methacrylamides, N-methylolmethacrylamide, methacrylamidopropyltrimethylammonium

chloride (MAPTAC), itaconic acid, maleic acid or its salts, maleic anhydride, alkyl or alkoxy- or aryloxypolyalkylene glycol maleates or hemimaleates, vinylpyridine, vinylpyrrolidinone, (alkoxy)poly(alkylene glycol) vinyl ethers or divinyl ethers, such as methoxypoly(ethylene glycol) vinyl ether or poly(ethylene glycol) divinyl ether, olefinic monomers, such as ethylene, butene, hexene and 1-octene, as well as fluoroolefinic monomers and vinylidene monomers, such as vinylidene fluoride; alone or as a mixture of at least two abovementioned monomers.

4. The process as claimed in any one of claims 1 to 3, characterized in that the mixing is carried out, with stirring, with more or less high shearing, of an aqueous phase comprising:

- water,
- at least one water-soluble alkoxyamine as defined above,
- optionally an anionic, cationic or nonionic, amphoteric or quaternary or fluorinated, emulsifying agent,

and an organic phase comprising:

- the polymerizable monomer(s),
- an optional organic solvent,
- an optional cosolvent, in particular in the case of a miniemulsion, which exhibits a solubility in water at 25°C of less than 1×10^{-6} g/liter and is liquid at the polymerization temperature, at a temperature preferably of between 10 and 130°C and at a pressure sufficient to prevent the phases of the emulsion from boiling and sufficient for its various constituents to remain essentially in the emulsion,

and optionally at least one free radical initiator of organic and/or inorganic peroxide type and/or of azo type.

5. A process for the preparation of multiblock polymers, characterized in that, in a first stage, a first block is prepared from one or more monomers according to the process described in any one of claims 1 to 4, then a second monomer or a mixture of monomers (different from the monomer or from the mixture of monomers which was used for the preparation of the 1st block) intended for the preparation of the second block is introduced without halting the stirring and without cooling or other interruption, optionally followed by the introduction of a monomer or a mixture of monomers (different

from the monomer or from the mixture of monomers which was used for the preparation of the 2nd block), and the like, it being understood that the conditions for forming each of the blocks will be adjusted depending on the nature of the monomers, optionally followed by a stage of conversion of the residual monomers using an additional supply of free radical initiator(s) of organic and/or inorganic peroxide type and/or of azo type.

6. A polymer particle, characterized in that it comprises a polymer capable of being obtained according to the process described in claims 1 to 5.

7. The particle as claimed in claim 6, characterized in that the polymer is a block polymer.

8. The particle as claimed in claim 7, characterized in that the polymer is one of the following:

polystyrene-b-poly(methyl methacrylate),
polystyrene-b-polystyrenesulfonate,
polystyrene-b-polyacrylamide,
polystyrene-b-polymethacrylamide,
poly(methyl methacrylate)-b-poly(ethyl acrylate),
polystyrene-b-poly(butyl acrylate),
polybutadiene-b-poly(methyl methacrylate),
polyisoprene-b-poly(styrene-co-acrylonitrile),
polybutadiene-b-poly(styrene-co-acrylonitrile),
poly(styrene-co-butyl acrylate)-b-poly(methyl methacrylate),
polystyrene-b-poly(vinyl acetate),
polystyrene-b-poly(2-ethylhexyl acrylate),
polystyrene-b-poly(methyl methacrylate-co-hydroxyethyl acrylate),
polystyrene-b-polybutadiene-b-poly(methyl methacrylate),
polybutadiene-b-polystyrene-b-poly(methyl methacrylate),
polystyrene-b-poly(butyl acrylate)-b-polystyrene,
polystyrene-b-polybutadiene-b-polystyrene,
polystyrene-b-polyisoprene-b-polystyrene,
poly(perfluorooctyl acrylate)-b-poly(methyl methacrylate),
poly(perfluorooctyl acrylate)-b-polystyrene,

poly(perfluorooctyl acrylate)-b-poly(behenyl acrylate,

poly(perfluorooctyl acrylate)-b-poly(stearyl methacrylate),

poly(n-octyl acrylate)-b-poly(methyl methacrylate),

poly(methyl methacrylate)-b-poly(butyl acrylate)-b-poly(methyl methacrylate),

poly(methyl methacrylate)-b-poly(methoxyethyl acrylate)-b-poly(methyl acrylate),

poly((meth)acrylic acid)-b-poly(butyl acrylate)-b-poly((meth)acrylic acid).

9. A combination of particles as claimed in claims 6 to 8, characterized in that the mean diameter of said particles is less than or equal to 2 μm, preferably between 20 and 1000 nm.

10. A latex comprising a combination of particles as defined in claim 9.